

# eBird Best Practices II

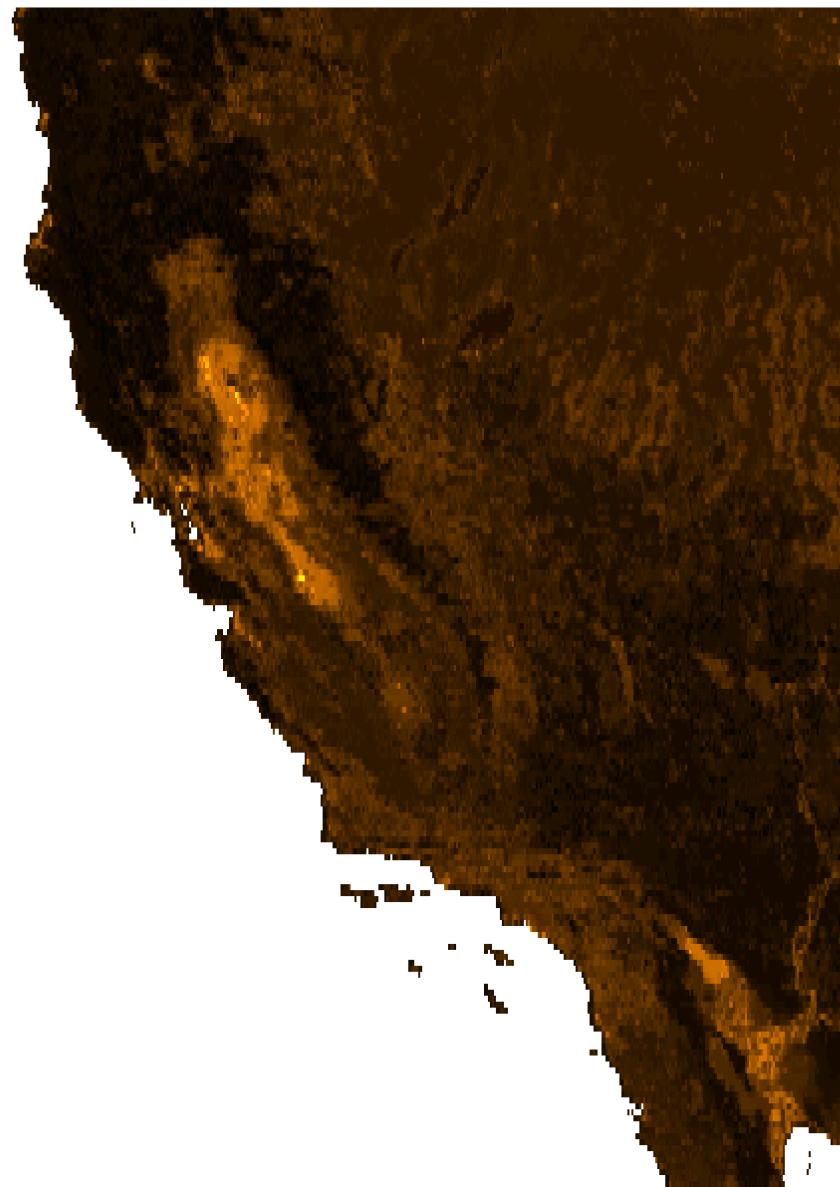
## Modeling Relative Abundance

The Cornell Lab  of Ornithology

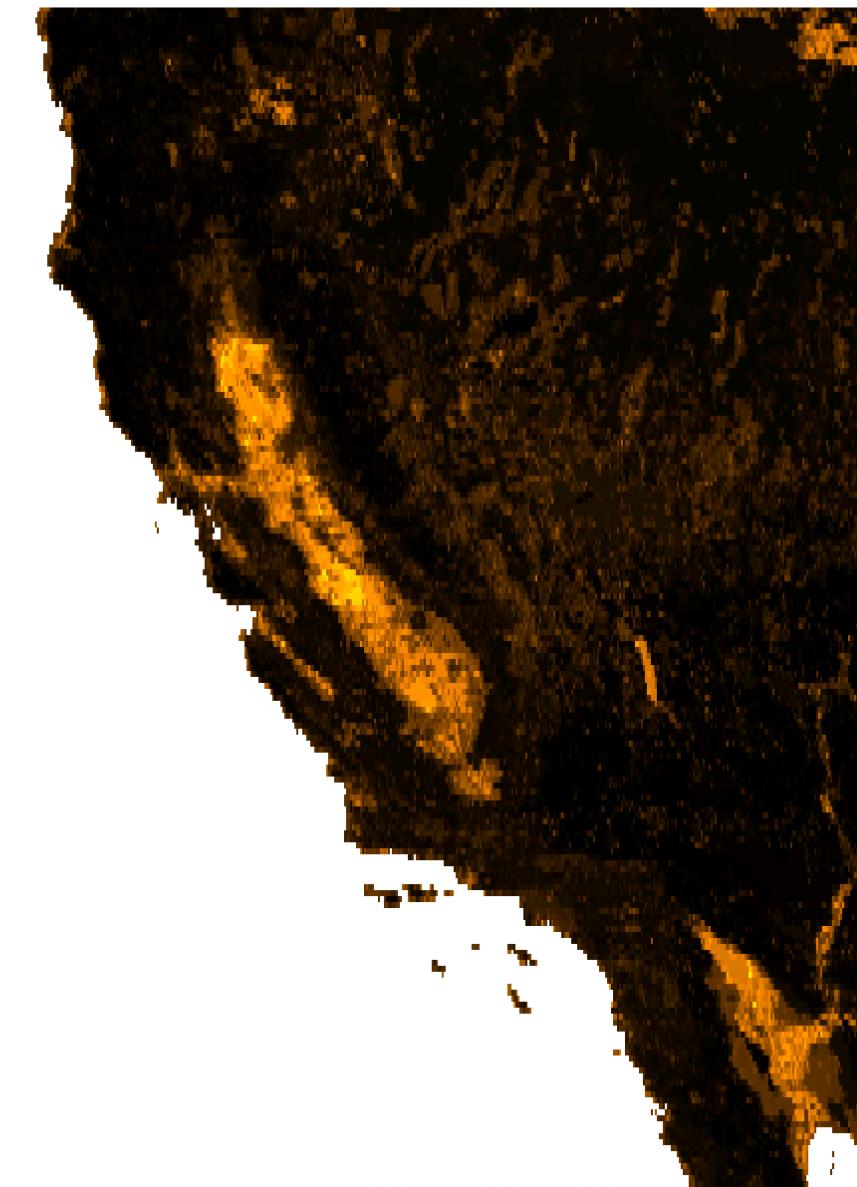
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**Encounter rate**



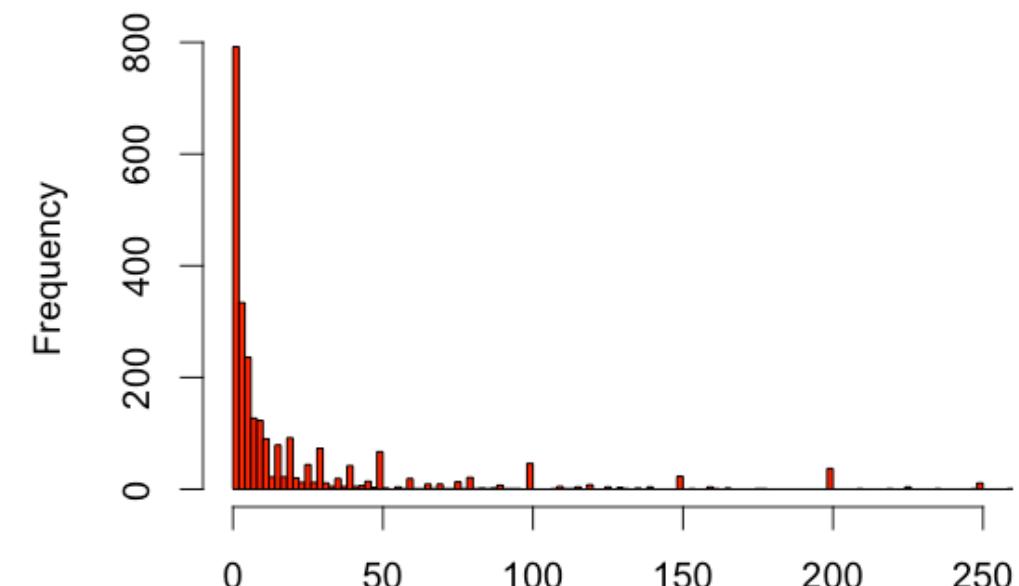
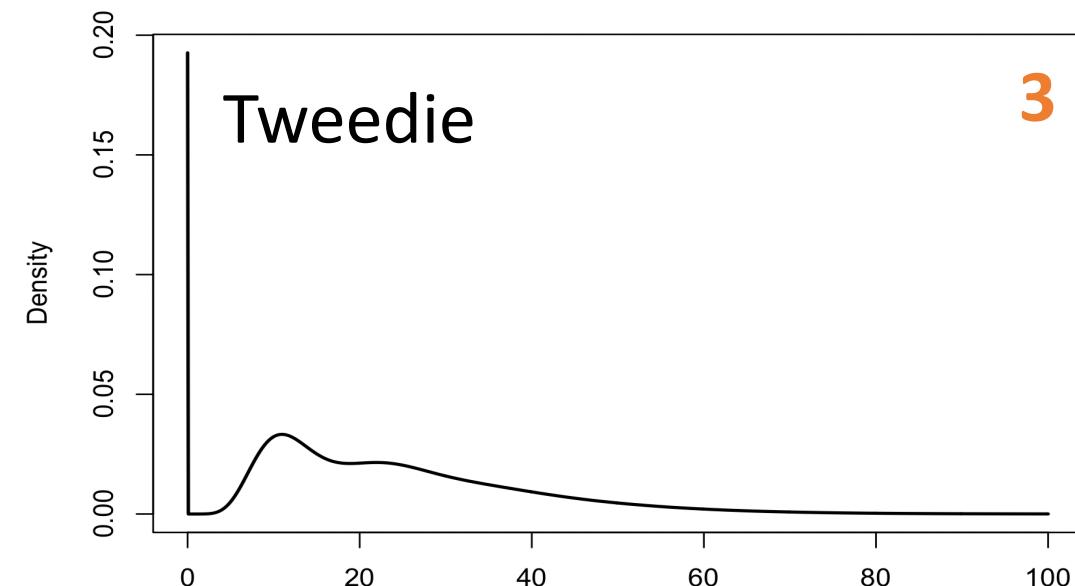
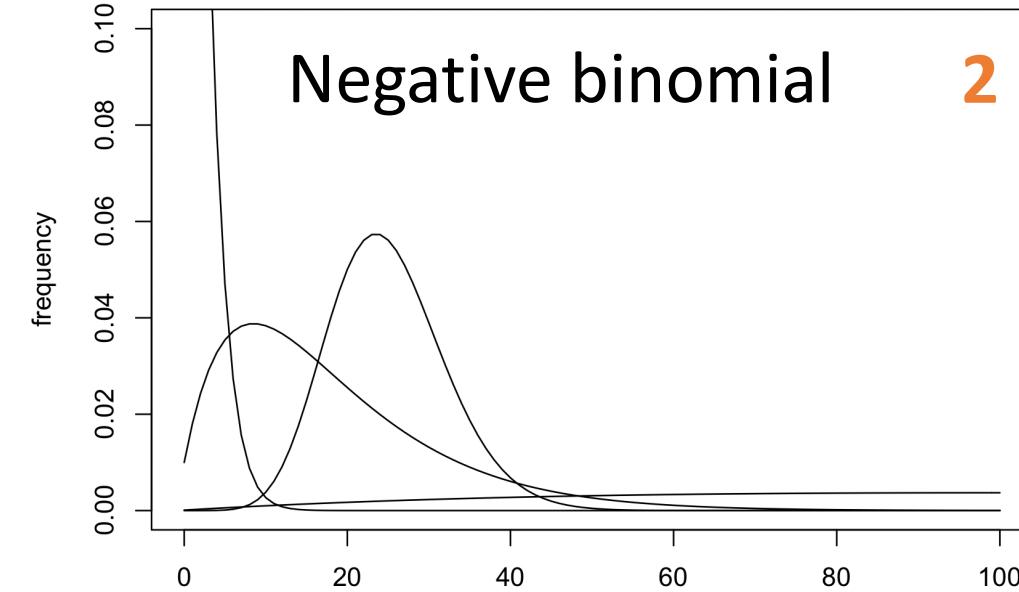
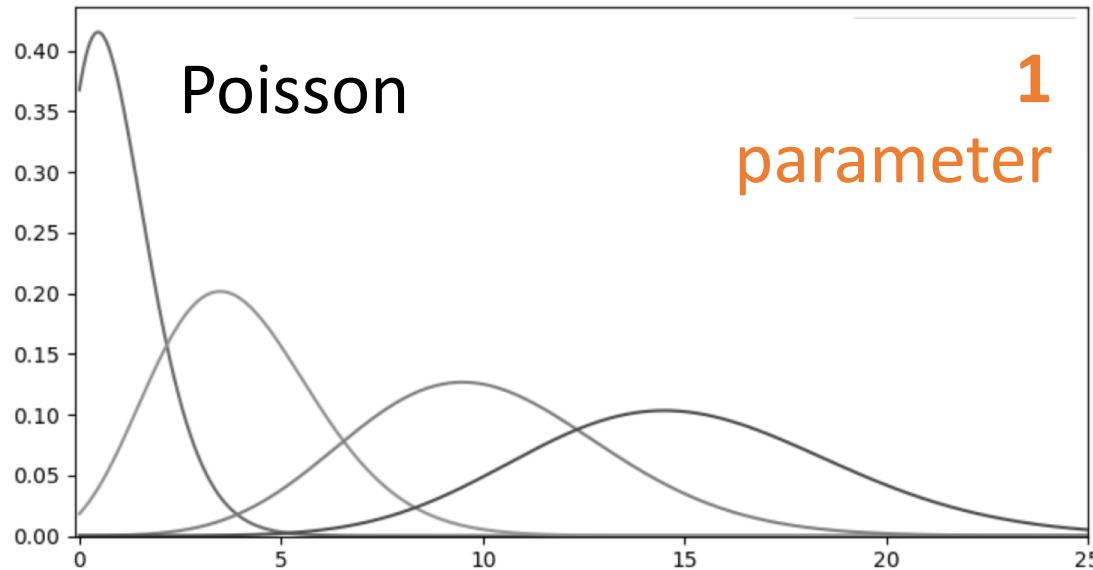
**Relative Abundance**



# Challenges estimating abundance

- Presence-only checklists (X)
- Bias in counts
- Infrequent, large flocks of birds
- Data characterized by many zeros, few high counts

# Abundance distributions



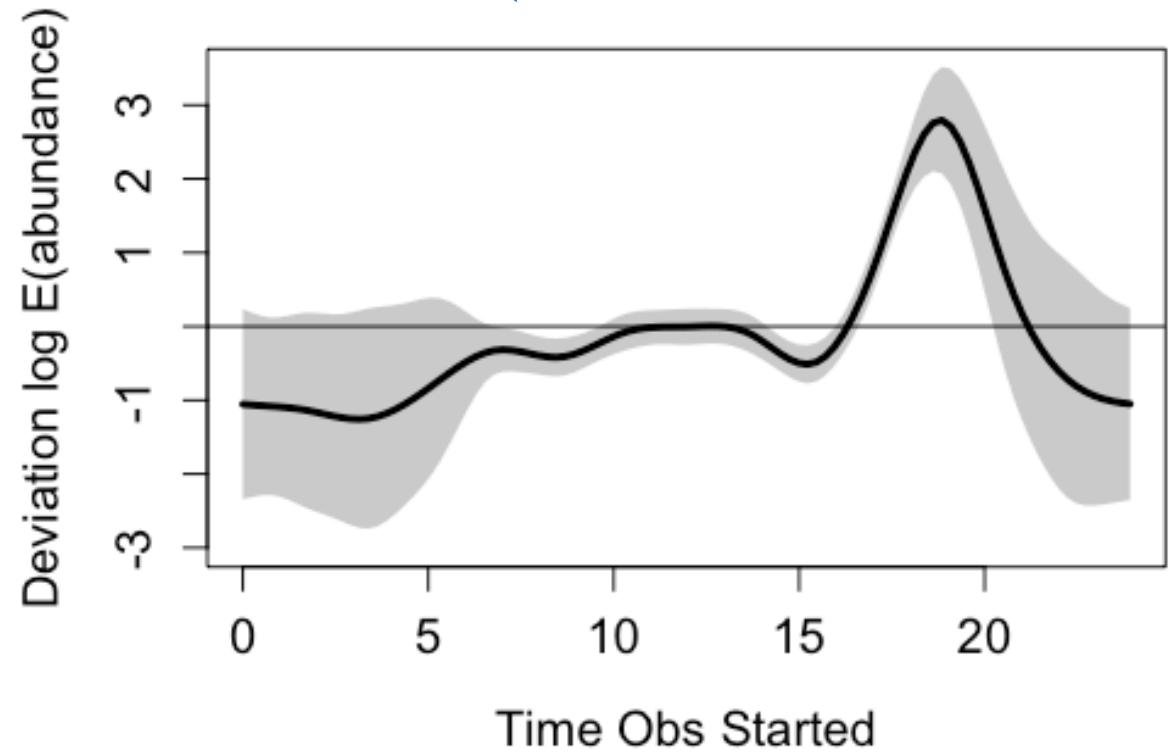
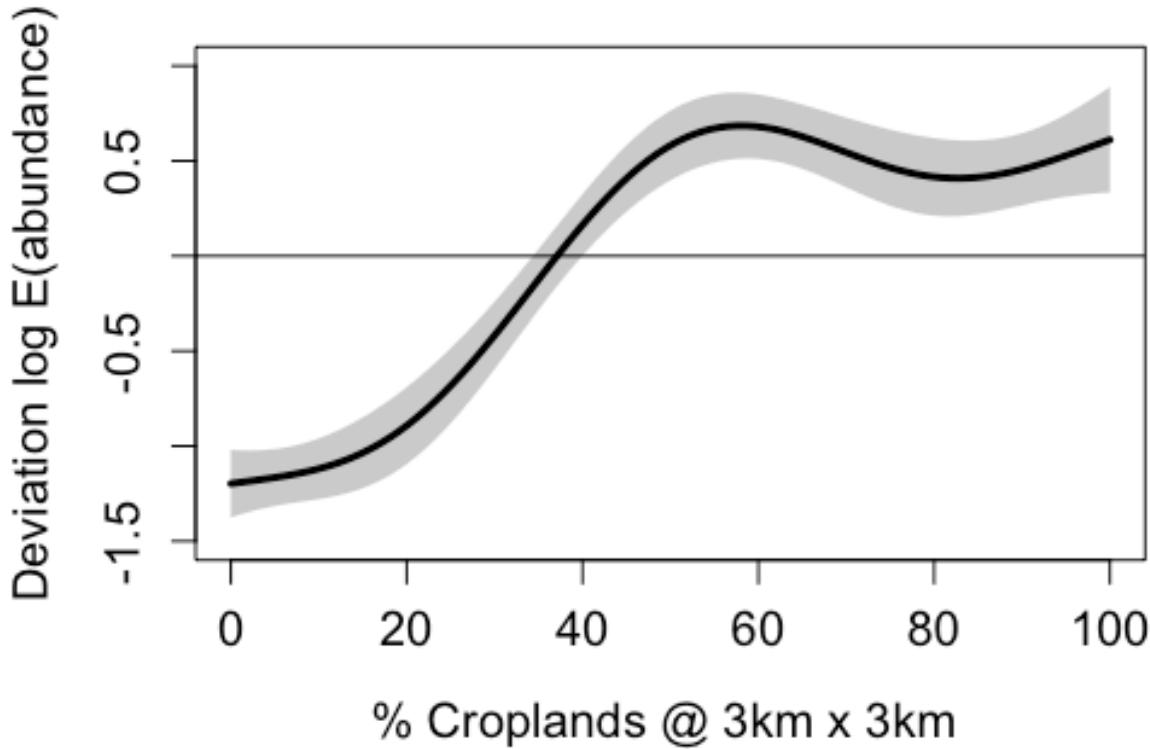
# Separating Signal and Noise

$$Y_i \sim f(\text{habitat}_i) + f(\text{observation}_i) + \epsilon_i$$

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Signals Noise

$$Y_i \sim f(\text{habitat}_i) + f(\text{observation}_i) + \epsilon_i$$



# Objectives



Inference

Explaining process

Prediction

Describing patterns

# Applications

## Patterns

- Where are species most or least concentrated?
- Minimum estimates of Population Size

## Process

- Habitat use / avoidance
- Climatic effects

## Align validation & applications

### Spatial & Temporal Scale

- Mean abundance 1km, 10km
- Mean abundance 1day, across season

### What kinds of errors are most important?

- Missed high counts
- Overestimated counts